



Light Fighter Lethality



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Light Fighter Lethality

STO: # IV.WP.2000.05



Program Objectives:

Define, develop & demonstrate lethality system technologies that are:

- ❖ Ultra-Light (Reduced Warfighter Weight)
- ❖ Versatile (Individual/Crew/Mission Specific)
- ❖ Lethality Objective 75% @ 500m

*... And Maximize Operational Utility
& Survivability*





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Program Goals:

- FY00 Establish initial weapon system architecture and preliminary error budget for a dual-munition pod firing micro-sized, course correcting seeker projectiles; *system weight will be less than 10 lbs (T), 5 lbs (O)*
- FY01- Verify conceptual architecture through constructive simulation,
FY02 individual system and force-on-force empirical performance, and conceptualize preliminary individual system designs
- FY03 Demonstrate critical, sub-system seeker projectile technologies to permit *single munition weight less than 0.5 lbs (T), 0.25 lbs. (O)*, and inertial guidance/course correction for a P_i *greater than 75% at 300M (T), 500M (O)*



Light Fighter Lethality

Weapon Weight & Recoil



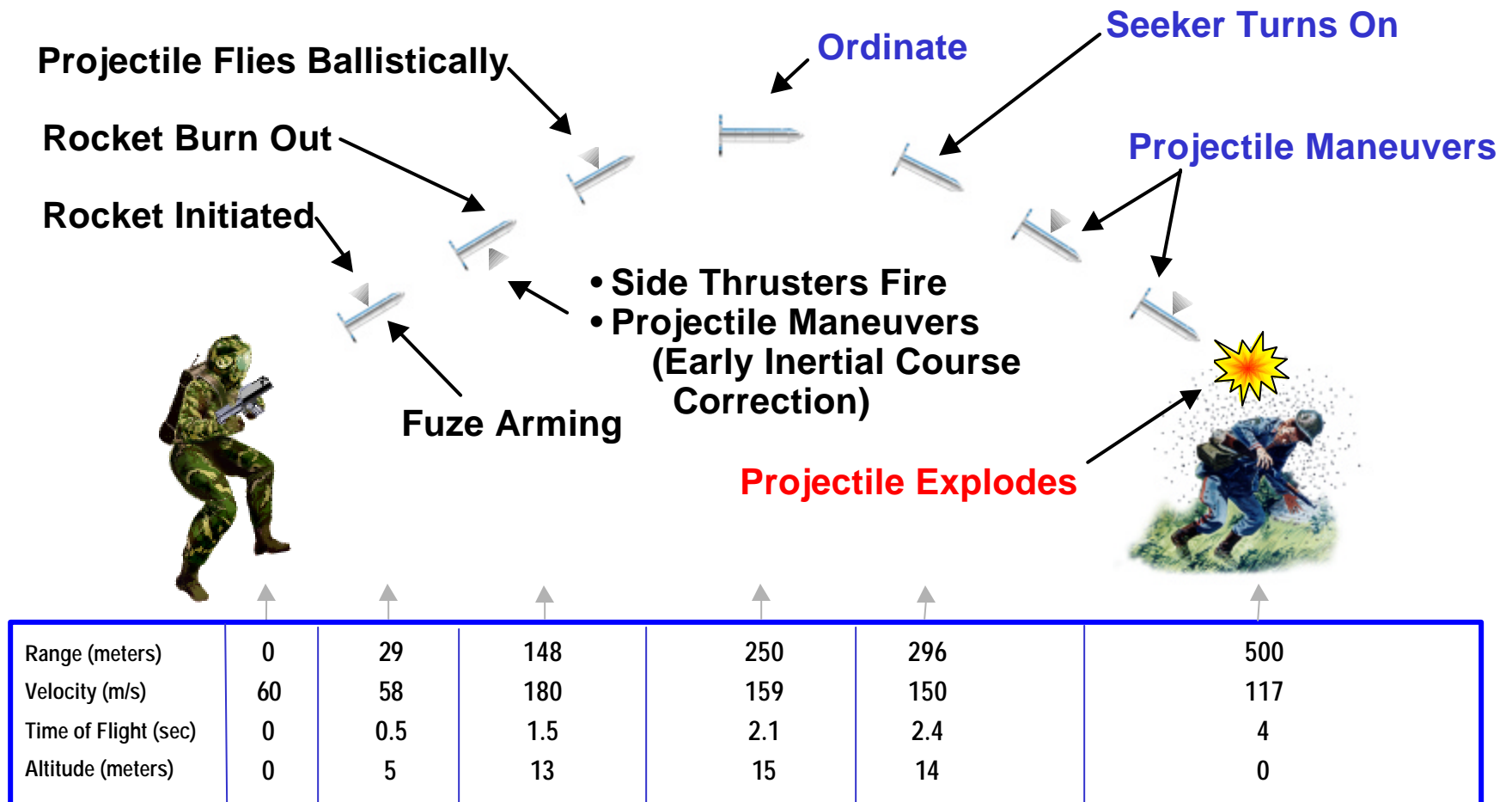
	M16A2/ M203	M4/ M203	
Weight	10.7	8.7	18% Lighter Weapon
Recoil Velocity	9.0	11.0	22% Higher Recoil Velocity
Recoil Energy	13.5	16.6	23% Higher Recoil Energy



Light Fighter Lethality

Seeker Projectile Concept of Operation

500m Trajectory Example

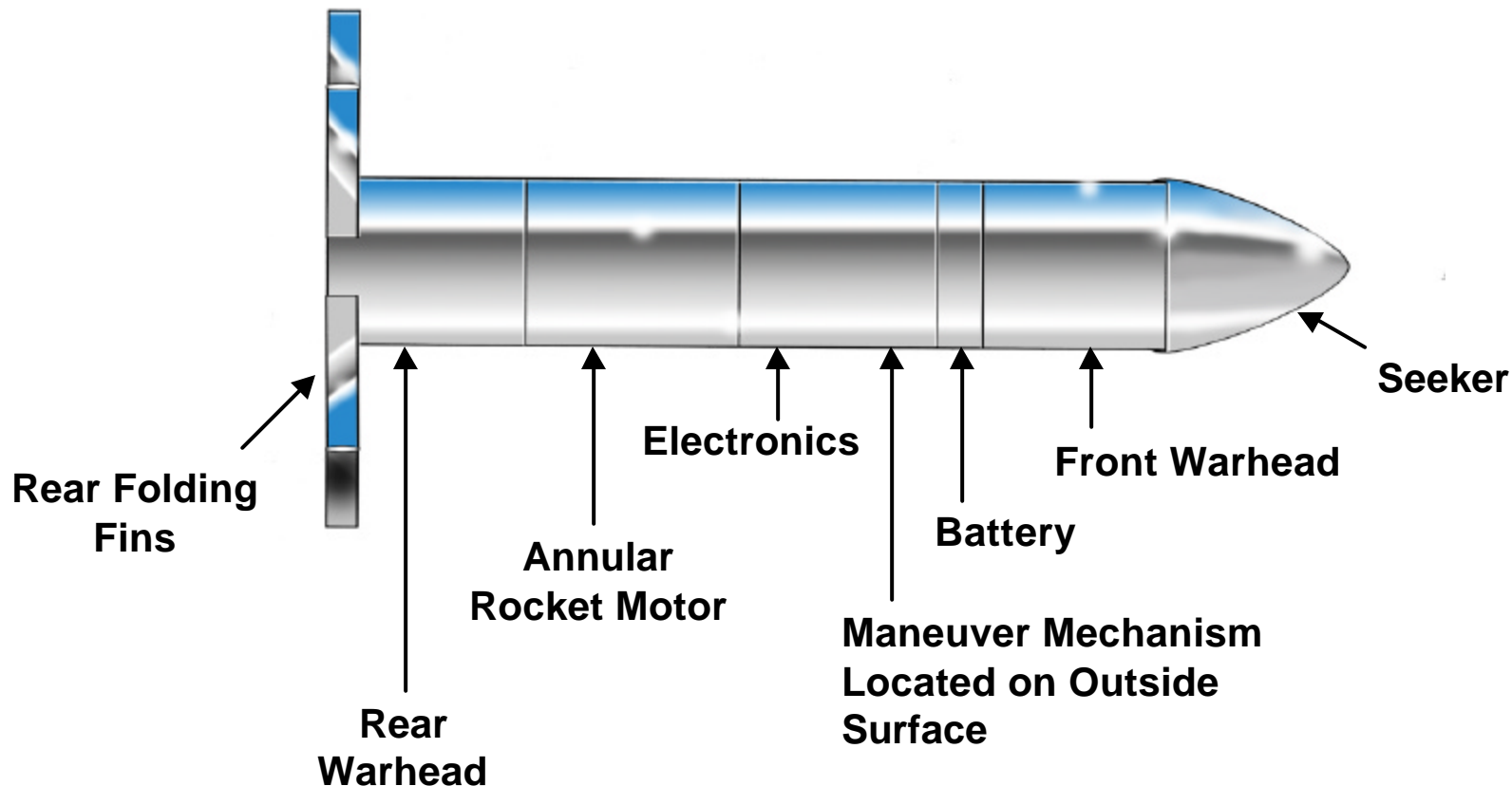




Light Fighter Lethality Seeker Projectile Concept

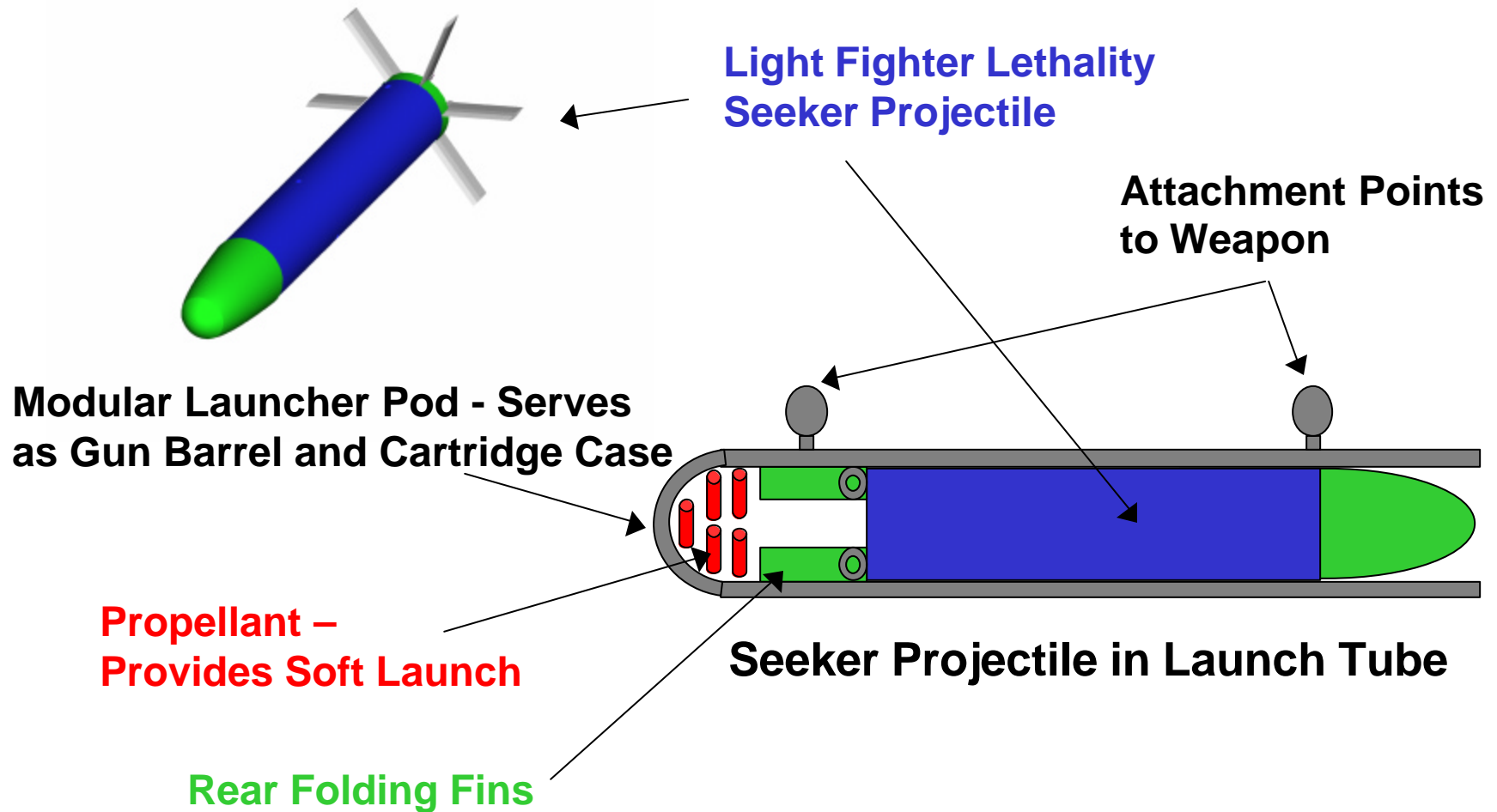


Annular Rocket Motor





Light Fighter Lethality Seeker Projectile Packaging





Light Fighter Lethality

IR Seeker Image



Simulated Using Indigo Alpha Camera:

- Uncooled Microbolometer Array (160x128)
- Cropped to 64x64 (Seeker Concept Array Size)
- 210 Meters Range, 14 Meters Altitude (Seeker Turn-on)



Standing Man



Crouching Man



Light Fighter Lethality Technical Animation





Light Fighter Lethality Technologies and Payoffs

Technology	Payoff
Soft Launch	<ul style="list-style-type: none">• Weight Reduction• Low Recoil• Low Signature
Maneuver Capability	<ul style="list-style-type: none">• Increased $P(h)$ & $P(i)$• Engage Defilade Targets• Engage Moving Targets
Autonomous Seeker	<ul style="list-style-type: none">• Fire & Forget• Rapid Engagement
Modular Weapon	<ul style="list-style-type: none">• Versatility (Caliber & Payload)• Off-ramps to Existing Systems• Maximize Integration w/ OFW



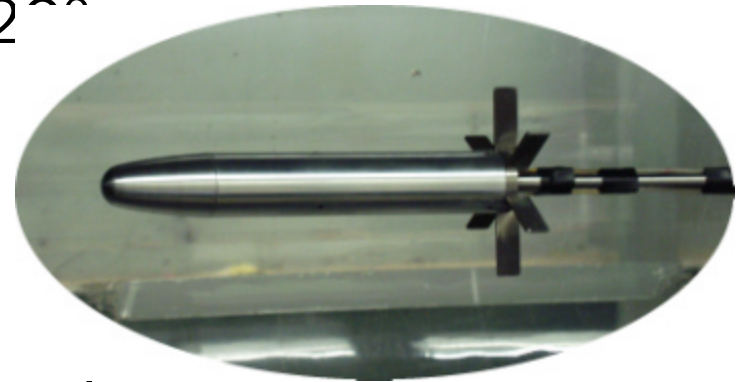
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Wind Tunnel Testing



Total of 688 Runs:

- ◆ Mach Numbers from .1 to .56
- ◆ Angles of Attack from -4° to $+2^{\circ}$
- ◆ 3 Different Fin Configurations
 - ⇒ Flat Plate
 - ⇒ Parallel Double Wedge
 - ⇒ NACA Wing (Airplane)
- ◆ Parallel Double Wedge Also Tested at:
 - ⇒ 2° and 4° Fin Cant
 - ⇒ Roll Angles of 7° , 15° and 25°





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Wind Tunnel Test Results



Test Results:

- ◆ Static Stability Margin Ratio for Double Wedge Fin:
 - ⇒ 23% @ Mach .56
 - ⇒ 10% Required for Stability
- ◆ Fin Designs Tested Are Stable



Future Plans:

- ◆ Apply Coefficients to 6-DOF Simulation
- ◆ Use Multiple Diverters in Trajectory
- ◆ Optimize Fin for Packaging and Stability
- ◆ Design Fin Opening Mechanism



Light Fighter Lethality Program Plans



Contract Strategy:

- CBD Announcement Published 7 August 2001
- RFP DAAE30-02-R-0400 will be Posted O/A 3 October
- Will be Utilizing Broad Agency Announcement (BAA)
- Contract will be in 3 Phases:
 - Phase I – Feasibility Study
 - Phase II – Breadboard Design
 - Phase III – Prototype Flight Testing
- Multiple Awards are Expected
- Period of Performance 21 Months (through FY03)



Light Fighter Lethality Projected Timeline



FY00 - FY03

FY04 - FY07

FY08 - FY10

FY11 - FY15

FY16 - FY20

Current STO

Demonstrate critical subsystem technologies: Soft Launch, Course Correction & IR Seeker

Follow-on STO

Intermediate Integration: Guidance & Nav, Warhead/ Fuzing, Fire Control System & Launcher

ATD →
New Weapon System

Acquisition Program

Fielding in FY16-FY20

OR

Acquisition Program

Off-Ramp to Existing Weapon System
Fielding in FY11-FY12

User Payoffs:

High P(h)
Low Recoil

Demonstrated P(i)
Target Acquisition
Reduced Weight

Full Weapon System Integration
& User Testing



Light Fighter Lethality Summary

- Seeker Projectile Concept is Feasible
 - 6-DOF Simulation Shows Stable Flight to 500m
 - Wind Tunnel Verifies Stability
 - Seeker Concept Shown to be Possible
 - Options Available for Maneuver Mechanisms
- Modeling and Simulation Underway
 - Demonstrate Added Capability of Maneuvering Projectile
 - Provide Opportunity for User Input

Light Fighter Lethality:
Significant Increase in Lethality
+ Dramatic Reduction in Weight